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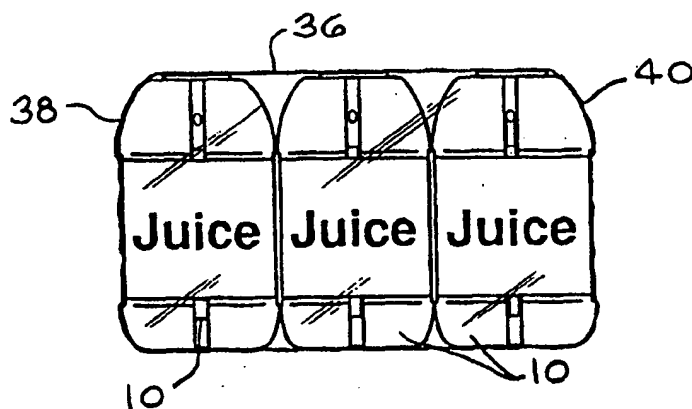
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(54) Title: RECYCLABLE BEVERAGE PACKAGE WITH BLOW MOLDED PLASTIC CONTAINER AND OXYGEN BARRIER WRAP



(57) Abstract

A beverage package having a blow molded plastic container (10) of a single resin that is filled with a beverage product and sealed. The sealed container is wrapped in an oxygen barrier film (36) to prevent oxygen from contacting the container and permeating through the container wall and thereby spoiling the beverage. The wrap (36) is separable from the container (10) before the beverage is consumed resulting in two separate, single material components for easy recycling. The molded container (10) includes an upright side wall (14) having a recessed groove (22) sized to receive and store a telescoping straw (24) for use in drinking the contents of the container.

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RECYCLABLE BEVERAGE PACKAGE WITH BLOW MOLDED  
PLASTIC CONTAINER AND OXYGEN BARRIER WRAP

FIELD OF THE INVENTION

5       The present invention relates to a package for a beverage and in particular to an aseptic beverage container of blow molded plastic with an oxygen barrier wrap surrounding the container.

10       BACKGROUND OF THE INVENTION

In recent years, the cardboard "juice box" has become a popular package for fruit juices and other beverages sold in a single service size container. Such juice boxes are popular because their low cost makes them disposable.  
15       However, to form a container having the necessary properties to store and preserve the contents, the present day juice boxes are constructed of several layers of different materials laminated together. The individual layers can not be efficiently separated for recycling of  
20       the various materials. As a result, the containers are deposited in landfills or incinerated rather than being recycled.

Accordingly, it is an object of the present invention to provide a single service "juice box" container of easily  
25       recyclable materials and of a construction which enables the different materials to be readily separated for recycling.

The beverage package of the present invention consists of a blow molded plastic container that is generally

rectangular in shape. The blow molded container is made of a single plastic resin such as high density polyethylene (HDPE) for which a recycled resin market has already been developed. However, since HDPE is oxygen permeable, the plastic container is hermetically sealed in a high barrier film to form an oxygen barrier around the container. The barrier prevents exposure of the container to oxygen, thus increasing the product shelf-life.

The barrier wrap and the blow molded container are separated from one another when the beverage is consumed. The result is two separate components, each of a single material and each readily recycled.

In a preferred embodiment, the blow molded container includes a recessed groove in its side wall for placement of a straw therein. A telescoping straw is used which enables, the straw to be packaged at a length less than the height of the container. Accordingly, a bend in the straw is no longer required. By placing the straw in a recessed groove in the container, the straw need not extend outwardly from the side of the container where it can be accidentally removed and lost. Further objects, features and advantages of the invention will become apparent from a consideration of the following description and the appended claims when taken in connection with the accompanying drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of the blow molded container used in the beverage package of the present invention;

FIG. 2 is a sectional view of the container side wall as seen from substantially the line 2-2 of FIG.1;

FIGs. 3 and 4 are plan views of the telescoping straw used with the package of the present invention;

FIG. 5 is a front elevation view of the container as blow molded showing the top and bottom mold flash;

FIG. 6 is a perspective view showing three blow molded containers being inserted into a barrier film wrap;

FIG. 7 is a front view of the three containers within the barrier wrap with one end closed and sealed; and

5       FIG. 8 is a front view similar to FIG.7 with both ends of the barrier wrap closed and sealed;

FIG. 9 is a perspective view of an alternative embodiment of the blow molded container used in the beverage package of the present invention; and

10       FIG. 10 is a sectional view of the container side wall as seen from substantially the line 10-10 of FIG.9.

#### DETAILED DESCRIPTION OF THE INVENTION

The beverage package of the present invention includes  
15   a blow molded container 10 shown in FIG.1. Container 10 includes a bottom wall 12, an upright side wall 14 and a top wall 16. The general configuration of the container 10 is rectangular, however other shapes can be used as desired. The top wall 16 includes an opening 18 through  
20   which the container 10 is filled with a beverage and through which the beverage is withdrawn when consumed. A strippable seal member 20 formed for example of a foil material or the like, is secured by an adhesive to the top wall 16 around the periphery of the opening 18 to close and  
25   seal the container.

The container side wall 14 is formed with a recessed groove 22 which is used to house a straw 24 for use in drinking the beverage from the container 10. The straw 24, shown in FIGs. 3 and 4, is a telescoping straw having an  
30   inner tube 26 and an outer tube 28. By telescopically collapsing the straw as shown in FIG.3, the overall length of the straw is less than the height of the container 10. This permits the straw to be contained within the recessed groove 22 and eliminates the need for a bendable straw.  
35   The straw 24 is preferably contained within a sealed plastic wrap, not shown, to keep the straw 24 clean.

Resilient projections 23 formed in the groove 22 are used to hold the straw within the groove. Alternatively, a small amount of adhesive can be used to mount the straw.

5 The container 10 is molded with a bottom flash 30 and a top flash 32, as shown in FIG.5, extending below and above the container. The top flash 32 is formed so as to close the opening 18, leaving the container sterile and sealed as it exits from the blow molding machine. The sealed container is conveyed into a clean room having a  
10 controlled environment. The top flash 32 is removed to open the sterile container inside the clean room. The container is then filled with a beverage product and is closed with the seal member 20.

The container side wall 14 has three distinct  
15 portions, a lower portion 19, a main central portion 21 and an upper portion 25. In the base portion 19, the side wall tapers outwardly and upwardly from the bottom wall 12 as best seen in FIG.5. In the main portion 21, the horizontal cross sectional size and shape of the side wall is  
20 substantially constant. In the upper portion 25, the side wall gradually tapers in cross sectional size toward the top wall 16. The top wall 16 is smaller than the bottom wall 12. This provides the container with increased vertical strength around the opening 18 so that the  
25 container can withstand the vertical load applied when the seal 20 is placed on the top wall. In addition, the opening 18 substantially consumes the top wall 16, having a diameter that is at least as large as half of the length of the top wall 16. This ensures that the vertical load on  
30 the container when the seal member is applied to the top wall is applied near the side wall where the top wall is supported.

Further processing occurs after the filled and sealed container exits the clean room. The straw 24 is mounted in  
35 the groove 22 and a label 34 is wrapped around the main central portion 21 of the container.

The final step in the packaging process is the application of the barrier film wrap. With reference to FIG.6, three filled containers 10 are shown being inserted into a film wrap 36. The film wrap 36 is in the form of a sleeve having two open ends 38 and 40. After the containers are inserted into the film wrap 36, one end of the film wrap 36 is closed and sealed as shown in FIG.7. The air within the wrap 36 is withdrawn by vacuum pump and the other end 38 of the film wrap 36 is closed and sealed.

10 The film wrap 36 presents a barrier to oxygen and hermetically seals the wrapped containers. The film wrap prevents oxygen from contacting the permeable plastic containers and permeating through the containers to spoil the beverage product. By preventing oxygen permeation, the  
15 unrefrigerated shelf life of the beverage is significantly increased. In addition to forming an oxygen barrier, the wrap 36 also joins multiple containers together in a package. While three containers are shown wrapped together in the film wrap 36, it will be appreciated that any number  
20 of containers can be contained within one film wrap.

The barrier film wrap is removed from the containers prior to consumption of the beverage. With the barrier film removed, the separate components, i.e. the blow molded container 10 and the barrier film wrap 36 can be easily  
25 recycled as each component contains a single material. The beverage package of the present invention is therefore advantageous when compared to current paper juice boxes having several layers of different materials laminated together.

30 A second embodiment of the blow molding container is shown in FIGs. 9 and 10 and indicated generally at 50. Container 50, like container 10, includes a bottom wall 12, an upright side wall 14 and a top wall 16. The top wall 16 includes an opening 18 for filling the container with a  
35 beverage product. Container 50 differs from container 10 in two major respects. The container 50 includes a

recessed straw groove 52 in each major face 54 formed by the generally rectangular side wall 14. By providing a straw groove in both major faces of the side wall, there is no longer a correct and an incorrect orientation of the container on a conveyor line. Regardless of which face is positioned toward the straw insertion equipment, there will be a groove for receiving the straw. The presence of the straw groove acts to increase the column stiffness of the side wall which is important during the application of the seal 20 on the opening 18. The container thus benefits structurally from the unused straw groove.

The straw groove 52 differs from the groove 22 shown in Container 10. The groove 52 does not extend through the top wall 16 of the container. Rather, the upper end 56 of the straw groove is below the top wall 16. This strengthens the side wall 14 from inward deflection of the major faces 54. The straw grooves act as creases in the side wall which facilitate inward deflection of the side wall. By terminating the groove short of the top wall 16, the top wall provides a transverse flange extending across the groove providing resistance to inward deflection of the major faces 54.

The grooves 52 have spaced sides 56 and 58 which project into the container. Resilient projections 60, like projections 23, are formed which extend into the groove to fictionally engage the straw 24 and hold it in the groove.

While the invention of the recyclable beverage package includes the blow molding container with an oxygen barrier wrap, it will be appreciated that the blow molded container with a groove for a straw has utility by itself. The container can be made of other plastic materials such as polyethylene terephthalate (PET) which do not need a barrier wrap or the container can be blow molded with a multiple resin layer structure in which one resin layer provides the necessary oxygen permeability barrier.



Obviously, it is preferred to use a single material in the blow molding container to facilitate recycling.

5 It is to be understood that the invention is not limited to the exact construction illustrated and described above, but that various changes and modifications may be made without departing from the spirit and scope of the invention as defined in the following claims.

I CLAIM

1. A package for a beverage comprising:  
a molded container of plastic resin having a  
bottom wall, a generally upright side wall and a top wall  
5 with an opening therein for filling said container with a  
beverage and through which said beverage is withdrawn;  
seal means for closing said opening; and  
an oxygen barrier film wrap around said container  
to prevent exposure of said container to oxygen.  
10
2. The package for a beverage of Claim 1 further  
comprising:  
a recessed groove in said container side wall  
projecting into said container; and  
15 a straw disposed in said groove for use in  
drinking the beverage from said container through said top  
wall opening.
3. The package of Claim 2 further comprising  
20 resilient means for retaining said straw within said  
groove.
4. The package of Claim 3 wherein said means for  
retaining said straw within said groove includes at least  
25 one resilient projection extending into said groove.
5. The package for a beverage of Claim 1 wherein  
said container is molded of a single plastic resin.
- 30 6. The package for a beverage of Claim 1 wherein  
said container is molded of high density polyethylene.
7. The package for a beverage of Claim 1 comprising  
a plurality of said molded with said oxygen barrier film  
35 wrap with said wrap holding said plurality of molded

containers together as a package and preventing exposure of said containers to oxygen.

5 8. The package for a beverage of Claim 7 wherein each said molded containers includes a recessed groove in said upright side wall and further comprising a straw entirely disposed in each said groove in fictional engagement with said side wall so as to be fictionally retained within said grooves.

10

9. A method of packaging a beverage product comprising:

15 blow molding a container of plastic resin having a bottom wall, a generally upright side wall and a top wall with an opening therethrough;

filling said container through said opening with a beverage product;

20 closing said opening with a seal member; and wrapping said container within an oxygen barrier film wrap and sealing said wrap to prevent exposure of said container to oxygen.

25 10. The method of Claim 9 wherein said blow molding step is carrier out so as to form a top mold flash on said blow molded container closing said opening and wherein said method further comprises the steps of moving said blow molded container with said top mold flash into a clean room having a controlled environment, removing said top mold flash to open said opening, and, after said filling and closing steps, removing said container from said clean room.

35 11. The method of Claim 9 further comprising the step of removing the entrapped air from within the barrier film wrap before sealing of the wrap.

12. The method of Claim 9 further comprising the step of positioning a plurality of said filled and closed containers adjacent to one another and wrapping said plurality of containers together with the oxygen barrier film to both join said containers together and to prevent exposure of said containers to oxygen.

13. The method of Claim 9 wherein said wrapping is accomplished by:

10       placing said container within a sleeve of an oxygen barrier film having two open ends;

          closing and sealing one end of said sleeve;

          substantially removing air from within said sleeve; and

15       closing and sealing the other end of said sleeve to hermetically seal said container within the oxygen barrier film.

14. A molded plastic container for a beverage comprising:

20       a bottom wall;

          a top wall spaced above said bottom wall;

          a generally upright side wall extending between said bottom wall and said top wall, said side wall being

25       configured to form a recessed groove projecting into said container of a size to receive a straw for use in drinking a beverage from said container; and

          said top wall having an opening therethrough for filling and emptying of said container.

30

15. The container of Claim 14 further comprising a straw entirely disposed in said groove and in frictional engagement with said side wall so as to be fictionally retained within said groove.

35

16. The container of Claim 14 wherein said groove has opposite sides projecting into said container and said container further comprises projections formed on said opposite sides of said groove extending into said groove to  
5 fictionally engage said straw.

17. The container of Claim 14 wherein said groove terminates at an upper end which is disposed below said upper wall whereby said top wall is not interrupted by said  
10 groove.

18. The container of Claim 14 wherein said side wall is generally rectangular in horizontal cross section having a pair of opposite spaced major faces with each of said  
15 major faces containing one of said recessed grooves projecting into said container.

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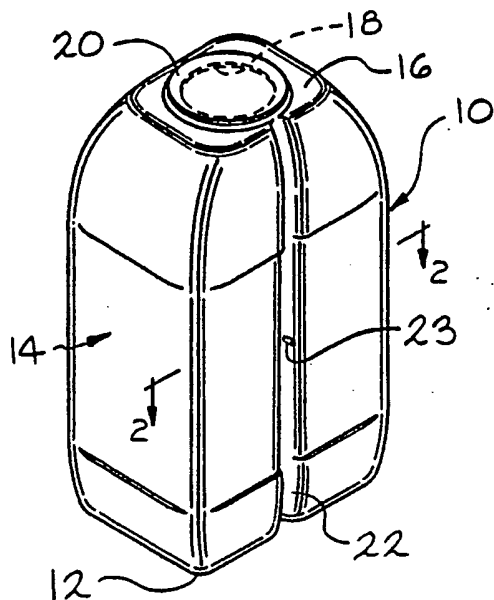


FIG. 1

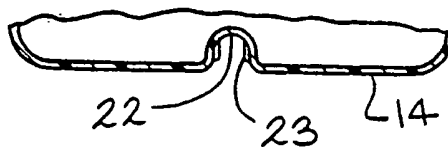


FIG. 2

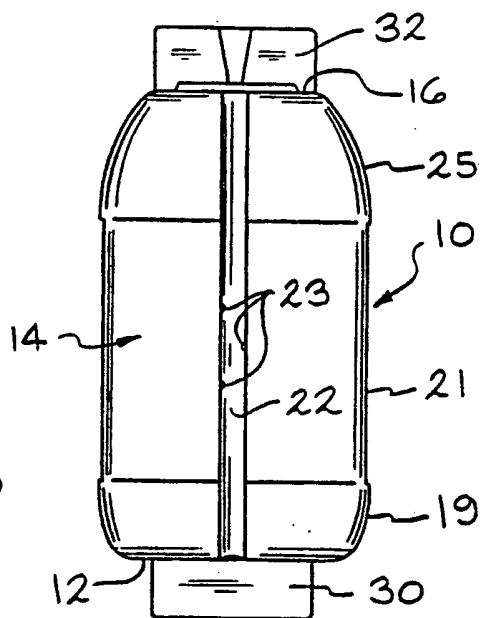


FIG. 5

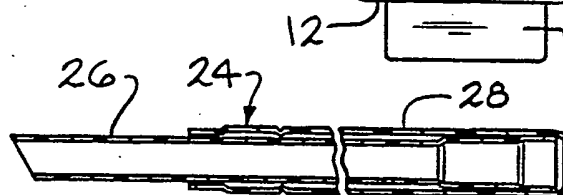


FIG. 3

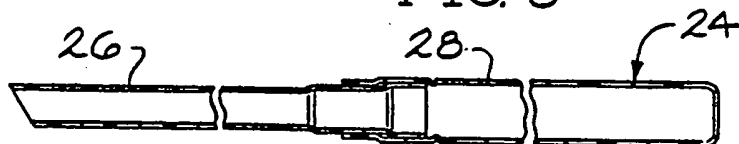
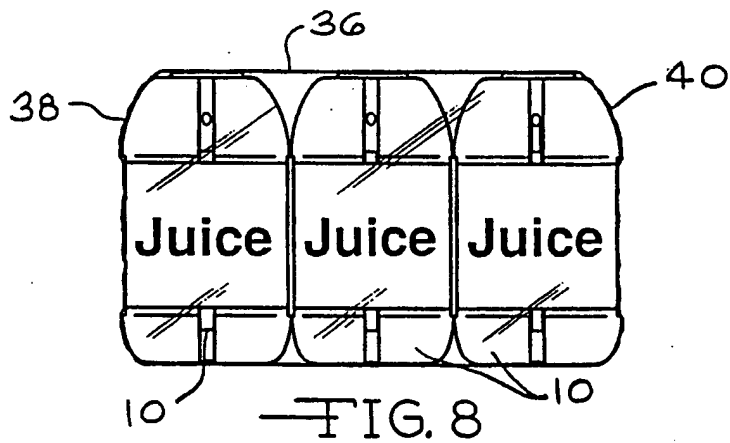
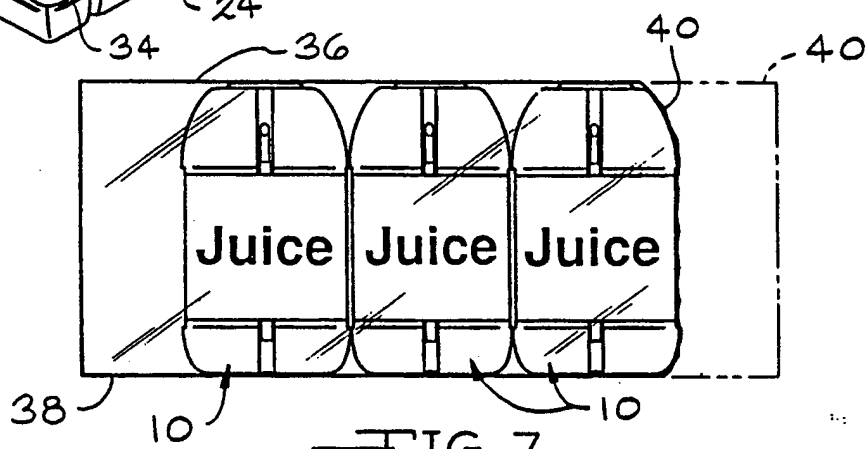
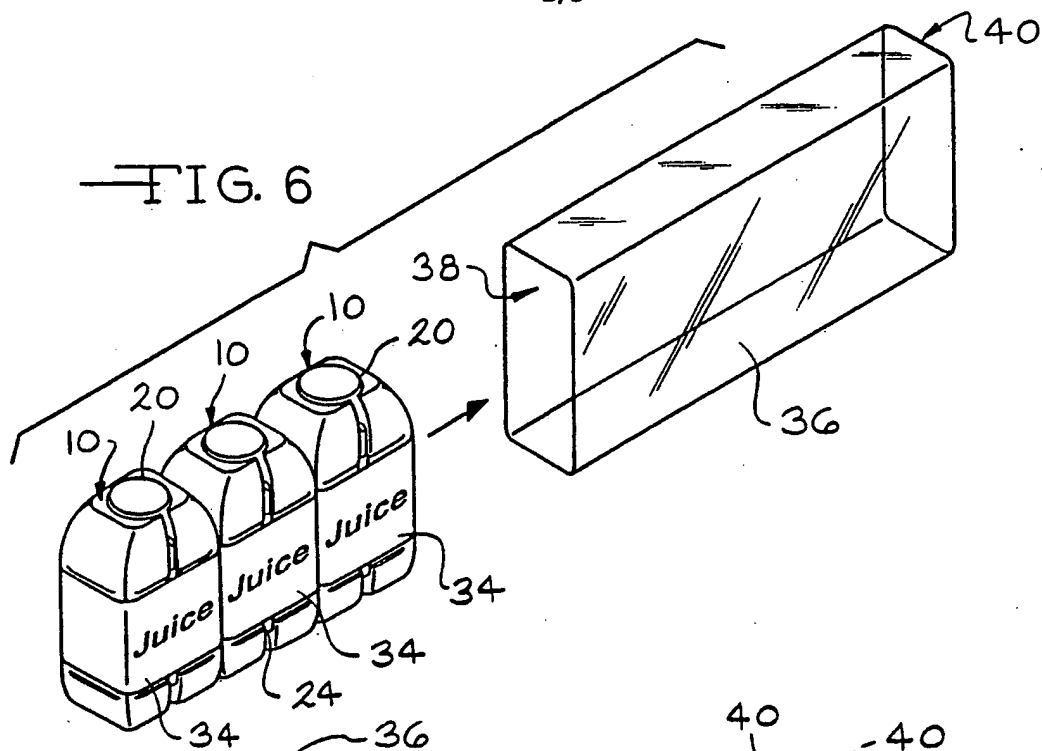


FIG. 4

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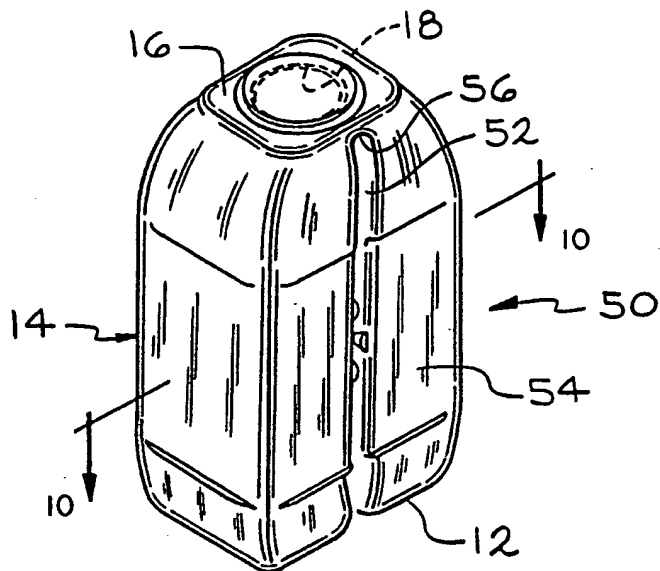


FIG. 9

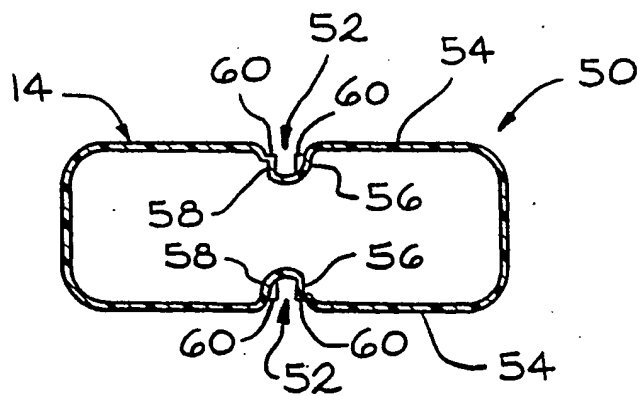


FIG. 10



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US94/04619

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(5) : B65D 77/00, 21/00

US CL : 206/217.000; 053/398.000

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 206/217, 434, 497; 215/1A, 1C; 220/449, 710; 229/89; 053/398, 173, 449, 453

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category*       | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No.                |
|-----------------|--|--------------------------------------|
| X<br>-----<br>Y | US, A, 4,051,265 (Kirshenbaum et al.) 27 September 1977, see entire document.      | 1, 5, 6<br>-----<br>2-4, 7, 8, 14-18 |
| Y               | US, A, 2,013,475 (Orton) 03 September 1935, see entire document.                   | 2-4, 7, 8, 14-18                     |
| Y               | US, A, 4,015,401 (St. Amand et al.) 05 April 1977, see entire document.            | 9-13                                 |
| Y               | US, A, 5,168,989 (Benno) 08 December 1992, see entire document.                    | 9-13                                 |
| A               | US, A, 3,409,710 (Klygis) 05 November 1968   | 9-13                                 |
| A               | US, A, 3,332,567 (Pugh, Sr.) 25 July 1967  | 1-8, 14-18                           |



Further documents are listed in the continuation of Box C.



See patent family annex.

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23 JUNE 1994

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## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US94/04619

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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|-----------|--|-----------------------|
| A         | US, A, 3,541,753 (Katz) 24 November 1970   | 1-8, 14-18            |
| A         | US, A, 4,963,419 (Lustig et al.) 16 October 1990                                   | 1-8, 14-18            |
| A         | US, A, 3,445,033 (Sweet et al.) 20 May 1969  | 1-8, 14-18            |